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A PHENOMENON OF THE KANSAN DRIFT IN NEBRASKA

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Among the minor phenomena of the glacial drift in Nebraska there is one which, though rarely observed by the public, is of interest and should be commended to the attention of naturalists. The reference here is to certain large, well-defined masses or blocks of such materials as sand, gravel, and coarse pebbles, which occur imbedded in the drift clays along with glacial boulders, and which presumably have been similarly transported and deposited. These masses or blocks vary widely in color, texture, and kind. They also vary from the glacial matrix in which they are found and are the more striking by virtue of contrast. They are not of frequent occurrence, but may occasionally be seen in fresh exposures especially in deep railroad cuts. Unfortunately they are quickly effaced by weathering and by growing vegetation. The most notable examples are found in the Milford cut-off of the Burlington Railroad, particularly at Pleasantdale. For a mile or so west of the station at Pleasantdale, especially on the right bank, fine examples occur in almost continuous succession (see the accompanying sketch and photograph).

The drift at this place is a jointed sandy clay of a rusty gray color, of a fairly compact texture, and about twenty-five feet in thickness. It is somewhat startling to find in it great stray blocks of various materials. These blocks are generally large and angular or rounded masses of incoherent soil, sand, and gravel, more or less stratified, cross-bedded, and tipped at all angles. It is still more surprising to find sections of small stream beds and channel deposits tilted and overturned. The dense quartzitic and occasional granitic boulders characteristic of the Nebraska drift, and these incoherent sand and gravel blocks occur together. Perhaps the arenaceous and argillaceous blocks were likewise dense and coherent at the time of transportation and

deposition, the assumption being that they were rigid because frigid. Accordingly we have coined for them, and for a long time

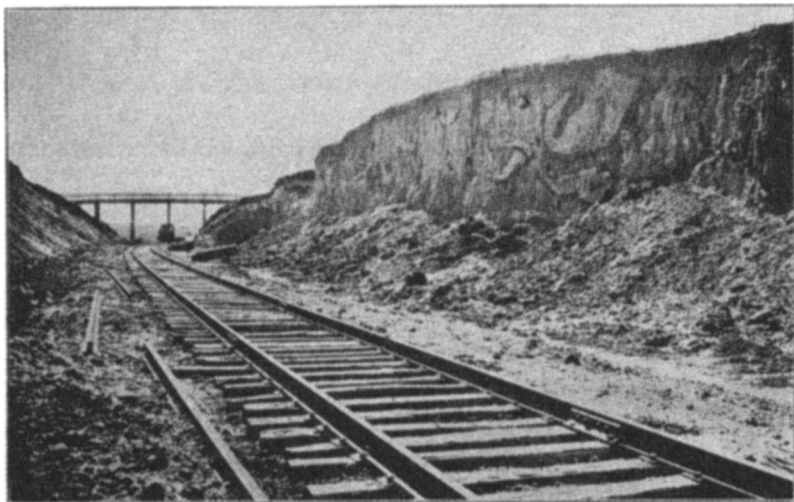


FIG. 1, A.—A bank of Kansan drift at Pleasantdale, Nebraska, showing “frigites” of clay, sand, gravel, and pebbles (see B). Distance to bridge about 1,000 feet.

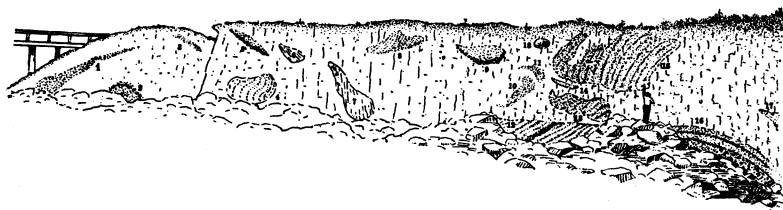


FIG. 1, B.—Key to A. Nos. 1, 3, 4, 8, 10, 11, 13, 14, 17 represent sand blocks (“sandfrigites”). No. 12 is a large cross-bedded sandfrigate about 30 feet long partly buried by talus. No. 15 is a large very distinct sandfrigate about 30 feet long. Nos. 2, 5, 9, 16 are supposed stream beds (“couleefrigites”). Nos. 6 and 7 are clay blocks (“clayfrigites”). No. 18 is a large Sioux quartzite boulder. Total length of section about 1,000 feet.

have used as a convenient generic field name, the word “frigites,” and have used as specific terms the additional names “soilfrigites,” “clayfrigites,” “sandfrigites,” “gravelfrigites,” “couleefrigites,”

etc., according to the component materials. Perhaps, as has been suggested, these are Aftonian.

Incident to the protracted frigidity of a glacial period is the freezing of soils, sands, and gravel to the rigidity of rock (frigate). Any natural force which could rend and transport rock could rend and transport the rocklike soils and sands. Continental glaciers are powerful graders and levelers. They act resistlessly upon rock and frozen soils and sands, breaking them into blocks and transporting them long distances southward. The load of rocks and frozen blocks is finally dropped by the melting ice, and buried in glacial mud. The blocks are thus preserved in their integrity. A stream bed, or coulee, could in a like manner be frozen, subsequently broken into sections, transported, and deposited.

The term "glacial drift" as used in an unfortunately restricted and local sense in Nebraska refers to that particular portion of the Kansan drift, which is rendered conspicuous by coarse pebbles and boulders of reddish Sioux quartzite. This layer is pretty generally recognized, and though it may be but a foot or two in thickness it is often expedient to speak of it popularly as "the drift." In a broader sense, however, our drift also includes, though less obviously, extensive beds of glacial clay, generally spoken of as joint clay, which may reach fifty feet in thickness. It has long been said facetiously by eastern geologists that the glacial deposits of Nebraska are "battered on so thin that one cannot tell the battered side." It is probable, however, that this bit of good humor would never have become classic had our drift not been confounded with our loess. There may be recognized an older, bottom layer of a dark, or even black color (sub-Aftonian, Jerseyan, or Nebraskan), and a younger, top layer of a lighter color, generally of a yellowish or reddish cast (Kansan), neglecting any Aftonian sands and gravels. The frigates herein described are confined to the Kansan drift.

It so happens that the drift often resembles the loess so closely that they run together, and seem to be terms in the same series. At times it puzzles even those who are experienced to distinguish between them. The southeastern half of Nebraska has for convenience been generally figured as one continuous loess sheet.

It must be noted here that there are extensive "loessless" regions in the southeastern as well as in the northeastern corners and elsewhere in the state. Frozen sand blocks have been observed in the drift of Iowa as well as in Nebraska, but as far as can be learned no examples yet found equal those in the Milford cut-off in point of size, variety, or numbers.